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line of study in a field where comparatively little beyond the result is known at present. The book is written in a clear and entertaining style that should commend it to the general reader as well as the student. It is an important addition to our agricultural literature, and will be welcomed by many who have felt the need of a general treatise on the subject.

E. W. ALLEN.

The Feeding of Animals. By WHITMAN H. JORDAN. New York, The Macmillan Co. 1901. Pp. 450.

This book by the director of the New York State Experiment Station, is the latest contribution to the excellent Rural Science Series. Several books on feeding have been published by American writers, but in some ways this is the most systematic and comprehensive treatment of the subject, especially as adapted to the needs of the student. While the teachings of European experiments and experience are taken account of, American conditions are kept constantly in mind, and this gives the book a distinct advantage over some which have adhered too closely to the German feeding methods. Dr. Jordan has combined a quite thorough review of the important scientific teachings on the subject, with a plain and clear statement of the application of these facts in practical feeding. He has digested the investigation relating to feeding at home and abroad, and gives the reader the benefit of his judgment and insight into the subject in interpreting and applying them. The applications which he makes of the science of feeding to practical conditions show that he is not bound down by any theoretical ideas or teachings but is thoroughly familiar with the standpoint of the practical feeder. He breaks away, in a measure, from the mathematical doses of nutrients prescribed in feeding standards, but at the same time he admits the value of these formulas as an aid in selecting adequate, uniform and well-proportioned rations. The first part of the book is taken up with the principles of feeding, the relations of plant and animal life, the composition and digestibility of feeding stuffs, the function of nutrients and the laws of nutrition; while the second part considers the practice of feeding, the selection and compounding of rations for

maintenance, for milk and meat production, for growing animals and for work, as well as questions of general management. The arrangement of the book is logical and orderly, and it is well suited to the needs of the student and the class room; in fact it may quite possibly prove more popular as a text-book than as a manual for the farmer or practical feeder, and for such a text-book there is perhaps the greater need at present.

E. W. ALLEN.

A Text-book of the Physics of Agriculture. By F. H. KING. Second edition. Madison, Wis., Author. 1901. Pp. xvi + 604. Figs. 276.

In this book, which is by the professor of agricultural physics in the University of Wisconsin and physicist of the experiment station, "the aim has been to present to the student who expects to be a farmer some of the fundamental principles he must understand to become successful." The author states that it is his purpose to present these principles from the physical rather than from the chemical or biological standpoint, and from that of the general student and farmer rather than from that of more technical scientific agriculture. Nevertheless, the book will be found to be a notable contribution to the literature of scientific agriculture in a field which has not heretofore received the attention its importance demands. The introduction deals briefly with certain general physical principles, laws and factors, a knowledge of which is necessary to an understanding of their subsequent practical application. Other chapters deal with the nature, origin and waste of soils; chemical and mineral nature of soils; soluble salts in soils; physical nature of soils; soil moisture; physics of plant breathing and root action; movements of soil moisture; conservation of soil moisture; relation of air to soils; soil temperature; objects, methods and implements of tillage (especially the plow); ground-water, farm wells, and drainage; principles of rural architecture, including strength of materials (posts, barn frames etc.), warmth, light and ventilation, principles of construction, construction of silos; farm mechanics, including principles of draft, construction and maintenance of country roads, farm motors (animal power, steam and gasoline

engines and windmills); farm machinery (general principles, belting, farm pumps, hydraulic rams); principles of weather forecasting, including discussions of the atmosphere and its movements and weather changes.

W. H. BEAL.

Chemische und medicinische Untersuchungen.

Festschrift zur Feier des sechzigsten Geburtstages von Max Jaffe, mit Beiträgen von M. ASKANAZY, P. BAUMGARTEN, M. BERNHARDT, R. COHN, TH. COHN, W. ELIASSOW, A. ELLINGER, J. FROHMANN, P. HILBERT, LASSAR-COHN, D. LAWROW, E. V. LEYDEN, W. LINDEMANN, W. LOSSEN, H. MEYER, E. NEUMANN, H. NOTHNAGEL, E. SALKOWSKI, W. SCHEELE, L. SCHREIBER, A. SEELIG, S. STERN, O. WEISS, R. ZANDER. With 8 plates. Pp. 472. Braunschweig, Friedrich Viewig und Sohn. 1901.

Such volumes as this 'Festschrift' are always of interest in recalling definitely the position and achievements of the scientist to whom they are dedicated, since they come at a time when his great creative work is generally completed. They reveal also something of that side of scientific investigation, unnoticed in the journals and text-books, but of so much importance in the development of thought, the personal relations of the investigators, their influence upon each other, and the inspiration derived by both from the association of teacher and pupil. The papers contributed to volumes of this character are, indeed, frequently distinguished for kindness of intention, rather than for intrinsic merit. Such is not the case in this volume. Most of the papers are the first presentation of important investigations, which might take their place worthily in any scientific or medical journal. The remaining articles, although presenting no new facts, are interesting on account of the ability and reputation of their writers, and afford suggestive discussions of some of the problems which are of special importance at the present time.

This volume is in every respect a fitting tribute to Jaffe. Although, of course, no word of it was written by him, there is throughout a tone which clearly reflects his influence. The firm grasp of the purely chemical aspects of the problems, even when dealing with clinical or

pathological subjects, the definiteness of the problems set before the investigator, and the clearly devised and vigorously executed experiments employed for their solution, show in the pupils the imprint of the teacher; in the friends, the influence of the coworker. It is one of the most hopeful signs for the future of medical investigations that they are adopting from chemistry and physics that habit of measuring without which science would be mere empiricism. If that quality be sought in Jaffe's researches which most entitles them to their place, it would probably be found in the exactness of the chemical methods employed. They are excellent examples of the application of pure chemistry to the problems of biology. Jaffe has rarely left an investigation of the complex organic substances, whose origin or influence in the animal body he has discovered, without having established also their structural formulæ. He seems to possess the even rarer gift of impressing this trait on others.

The contents of the volume are arranged in three parts, of which the first is devoted to clinical medicine. In the opening article, v. Leyden, as the oldest friend and coworker of him in whose honor he writes, reminds the reader that they two were the first to introduce into medicine, as long ago as 1866, the use of oxygen gas. After reviewing briefly the opposition or rather indifference with which this method of treatment was long regarded, especially in Germany, the writer dwells with just pride on the universal acceptance at the present day of the value of oxygen inhalation, not only in cases of morphine, strychnine and carbon-monoxid poisoning, extreme chloroform narcosis and dyspnoea from many other causes, but also as a therapeutic agent in several of the diseases of the respiratory organs. Following this paper are articles by Nothnagel on 'Intestinal Hemorrhages,' Scheele on 'Subphrenic Abscesses,' and Frohmann on 'Primary Sarcoma of the Intestine.' To these are added a report and discussion by Eliassow on 'Three Cases of Degenerative Chorea,' and by Bernhardt three reports upon cases of 'Localized Convulsions in the Upper Extremities,' 'Localized Convulsions in the Lower Extremities,' and 'Infantile Facial Paralysis.' To